



Europäisches
Patentamt
European Patent
Office
Office européen
des brevets

Description of WO03080334

[Print](#)

[Copy](#)

[Contact Us](#)

[Close](#)

Result Page

Notice: This translation is produced by an automated process; it is intended only to make the technical content of the original document sufficiently clear in the target language. This service is not a replacement for professional translation services. The esp@cenet® Terms and Conditions of use are also applicable to the use of the translation tool and the results derived therefrom.

< Desc/ Clms PAGE NUMBER 1 >

Description

Multilayer laser transfer foil for durable marking of components

The invention relates to a multilayer laser transfer foil for durable marking of components from at least a carrier layer, whereby is at least partial present on the lower side of the carrier layer a first adhesive layer, on which at least two pigment layers applied are.

To the identification of components at vehicles, machines, electrical and electronic devices among other things technical labels use, thus as vehicle identification plates, find as tax labels for process flows as well as Garantie-und Prüfplaketten.

The identification by means of laser labels and more printed or more painted metal-describe possesses straight in the automobile industry, in particular for high-quality markings, an increased value. In this way informations and references become placed such as tire pressure or kind of fuel for the later user on most diverse components of the automobile. Also in the upstream Fertigungsstufen important production data can become over a laser label transported.

For this application the label with a bar code can be marked. By a suitable reader an assembly team receives the possibility, to direct at the production line informations over model to select color and special equipment by the bar code.

In addition, apart from these standard information sensitive safety data become such as Fahrgestell-und identification numbers by labels at the vehicle placed. In case of

< Desc/ Clms PAGE NUMBER 2 >

from theft or accident these informations for a backtracing of vehicle and Fertigungsstufen are of great importance.

The inserted label material must zuwirken therefore, around manipulation attempts against, be as falsification safe as possible. It may not become detached non destructive of the Verklebungsggrund.

Additional security becomes achieved over the high brittleness of the material in combination with high adhesive forces. The adhesive force of the material on the clamping coat plays a large role. It is decisive for the resistance against a manipulation attempt by peelings.

Beside the standard material there are modified labels, which are to make an imitation of the material impossible by other safe of heating characteristics such as embossments, holograms or a permanent UV impression (footprint).

Powerful controllable lasers for burning markings such as writings, codes and such a thing are common. To the one which can be marked and/or the material inserted to the label the among other things subsequent Anforderung becomes towards provided: It should be beschriftbar quick.

It is to become an high spatial resolving power achieved.

It should be in the application as simple ones as possible.

The decomposition products are not to work corrosive.

Beyond that additional characteristic characteristics become required for particular cases: By means of Belaserung manufactured indicia it should be so high-contrast that they can be read also bottom unfavorable conditions over far removals correct.

High temperature resistance should be given, for example to over 200 C.

Good resistance against weathering, water and solvent is desired.

< Desc/ Clms PAGE NUMBER 3 >

With the use of flat, sharp blades succeed in separating labels complete from the substrate. Particularly on plastic undergrounds such as polyethylene or polypropylene the composite shows between sticking mass and ground weakness.

Despite an elevated adhesive force on metallic or painted substrates is it also, there possible to replace by use of special tools a part of the labels without Zerstörung. A special blade tool can do that in a flat angle bottom

Label guided become. By careful cut movements it is possible, one

To raise edge, whereby a Anfasser so mentioned develops. In this way generated one a point of attack, a peeling the simplified.

Labels exhibit thus a disadvantage in principle.

Case the labels not with a laser label on the component applied will separate the easy possibility by means of imprint, exist for third the label abzu to wash or abzurubbeln. Also simple rubbing of the marked article against a second subject-matter, for the example of a packaging, around the single letters or digits is often enough to weak.

Object of this invention is it to be created a multilayer laser transfer foil those the quick and precise marking of arbitrary components possible, which become fair the requirement the mentioned of of the improved falsification safeness, which is not more releasable even non destructive with the help of a cutting tool, further in particular high contrast, high resolving power, high temperature resistance and in subject application possibilities exhibit.

Dissolved one becomes this object by a multilayer laser transfer foil, as it is described in accordance with principal claim. Subject-matter of the Unteransprüche are advantage particularly cling to embodiments of the invention article as well as uses of the same.

Accordingly the invention concerns a multilayer laser transfer foil for durable marking of components from at least a carrier layer, whereby is at least partial present on the lower side of the carrier layer a first adhesive layer

< Desc/ Clms PAGE NUMBER 4>

and whereby on the side of the carrier layer of the laser transfer foil, on that itself first Adhesive layer finds, at least two pigment layers present is.

Preferably it concerns a at least partial laid on first pigment layer, which contains at least a glass river pigment, and at least partial up GET RA of genes second pigment layer, which contains at least a laser-sensitive pigment.

In a favourable embodiment the first pigment layer contains a glass river pigment and an absorber and/or the second pigment layer a glass river pigment, an absorber and a laser-sensitive pigment of the invention.

The adhesive will preferred full laminar on the carrier layer applied, can however depending upon application also partial coated become. If the first pigment layer becomes applied, then this can be to the one in the direct contact with the carrier layer, rest upon on the other hand in addition, the first adhesive layer, independent of it whether the first pigment layer is likewise partial applied.

Comparable one applies to the second pigment layer as well as all if necessary subsequent pigment layers. Second and the other pigment layers become in each case on those before applied layers coated, partial depending upon application or vollflächig. Depending upon kind of the job as well as the distribution that underlying layers most different variations in the setup of the laser transfer foil result in each case.

Preferably the backbone that consists the pigments contained layers even if of the adhesive of the first adhesive layer, so that the first adhesive layer and the Pig mentschichten a single homogeneous layer form. Only in the marginal area of the homogeneous layer, on that the carrier layer of opposite side, are in one in particular comparatively narrow region of the homogeneous layer the Pig mente distributed in different composition. Two or several barrier layers form accordingly.

In order to improve the adhesion properties of the multilayer laser transfer foil on the component which can be marked more other, a second adhesive layer is preferably on those the laser-sensitive pigment contained second pigment layer up GET RA towards.

< Desc/ Clms PAGE NUMBER 5>

In particular the second adhesive layer can be in the form of Dots or in the screen printing up brought, if necessary also as wing tip edge printing, so that the transfer foil in arbitrary way on the ground can become bonded.

Preferably the thickness of the individual layers becomes selected from the subsequent Berei chen:

Carrier layer (preferred PET) 12 around to 240 over, particularly 100 over to 200 over

Adhesive (preferred acrylate) 5 around to 45 over, particularly 25 around to 35 around first pigment layer 1 around to 10 over, particularly 2 around to 5 around second pigment layer 1 around to 10 over, particularly 2 over to 5 over

The films, which are to find use according to invention as carrier material, should be transparent and/or translucent, at least must them in such a manner designed be that an absorption of the laser beam, which would lead to a destruction the same is out closed.

In particular it is desirable, if the carrier material within the waving of prolonged range from 530 to 1064 Nm no light absorbed.

As carrier material preferably films can be begun, which are in an other excellent designed variant of the invention transparent, in special monoaxial and biaxial stretched films on basis of polyolefins, then films on basis of stretched polyethylene or stretched copolymers, according to invention contained ethyl and/or polypropylene units, if necessary also PVC films, films on basis of vinyl polymers, polyamides, polyester, polyacetals, polycarbonates.

In particular pet films are excellent suitable as carriers.

Also films on basis of stretched polyethylene or stretched copolymers, enthal tend Ethylen-und/or polypropylene units, can be begun as carrier film in accordance with invention.

< Desc/ Clms PAGE NUMBER 6>

Monoaxial stretched polypropylene is characterised by its very high tear resistance and small elongation in longitudinal direction. Preferred labels in accordance with-eaten to the production the invention is monoaxial stretched films on basis of polypropylenes.

Particularly preferred for the laser transfer foils according to invention is einschichtige, biaxial or monoaxial stretched films and multilayer, biaxial or monoaxial films on basis of polypropylenes, which exhibit a sufficient fixed composite between the layers, since a Delaminieren of the layers is adverse during the application.

Films on basis of hard PVC become the production of laser transfer foils just as used as films on basis of soft PVC.

For the laser transfer foils according to invention films become preferably used on basis of hard PVC.

Films on polyester basis, for the example polyethylene terephthalate are likewise known and can likewise the production of the transfer foils according to invention inserted become.

Polyesters are polymers, whose basic modules by ester connections (- CO-O) to be held together. After their chemical setup sogenann ten Homopolyester leave themselves in two groups to divide, 'the hydroxy acid types (off polyesters) and 'the Dihydroxy dicarbonic acid types (AA-BB-polyesters).

First become from only a single monomer through the example polycondensation of a CO hydroxycarboxylic acid 1 or 2 manufactured by ring opening polymerization of cyclic esters (lactones), the example

< Desc/ Clms PAGE NUMBER 7 >

EMI 7.1

2 the setup latter made Monomerer, for the example a diol 3 and a dicarbonic acid 4, complementary against it by polycondensation of two:

EMI 7.2

Branched and crosslinked polyesters become obtained with the polycondensation of three or polyvalent alcohols with polyfunctional carbonic acids. The polyesters general become also the polycarbonates (polyesters of the carbonic acid) calculated.

Abbott YP polyesters (I) are and. A. Polyglycolic acids (Polyglykolide, R = CH₂), Polymilch acidic (polylactides, R = CH-CH₃), Polyhydroxybuttersäure [Poly (3-hydroxybuttersäure), R = CH (CH₃) - CH₂], Poly (s-caprolacton) e [R = (CH₂) 5] and Polyhydroxybenzoesäuren (R = C₆H₄).

Pure aliphatic AA-BB-TYPE-polyesters (II) are polycondensates from aliphatic diols and dicarbonic acids, those and. A. as products with terminal hydroxy groups (when Polydiol) for the production of polyester PU inserted become [to the with play Polytetramethylenadipat; G 1 = R₂ = (CH₂) 4].

AA-BB-TYPE-polyesters have quantitatively largest technical importance out aliphati schen diols and aromatic dicarboxylic acids, in particular the Polyalkylentere phthalate [R₂ = C₆H₄, with polyethylene terephthalate (PET) g 1 = (CH₂) 2, Polybutylentere phthalat (PBT) g 1 = (CH₂) 4 and Poly (1, 4-cyclohexandimethylenterephthalat) e (PCDT) g 1 = CH₂-C₆H₁₀-CH₂] as most important members. These types of polyester can by Mitverwenden of other aromatic dicarboxylic acids (for the example isophthalic acid)

< Desc/ Clms PAGE NUMBER 8 >

and/or by use of Diol mixtures with the polycondensation in their properties wide varied and different application fields adapted who that.

Pure aromatic polyester are the polyarylates, to those and. A. the Poly (4-hydroxy benzoic acid) (formula I, R = C₆H₄), polycondensates from bisphenol A and phthalic acids (formula II, g 1 = C₆H₄-C (CH₃) 2-C₆H₄, R₂ = C₆H₄) or also such from bisphenols and phosgene belong.

The adhesive of the first and second adhesive layer of the laser according to invention transfer foils knows a self adhesive mass on basis of natural rubber, PURE, Acryla ten or styrene isoprene styreneBlockcolymere to be.

The use of adhesives on basis of natural rubber, acrylates or styrene Isopren Stryrol is known, which also for the example in the " Handbook OF pressure sensitive adhesive technology, second edition, edited by Donatas Satas, Van Nostrand Reinhold, New York, 1989 described becomes.

As self adhesive mass comes a commercial pressure-sensitive in particular Sticking mass on PURE, acrylate or india rubber basis to the use.

Particularly favourably as adhesive such proved workable system on Acrylathotmelt basis, which exhibits a K value of at least 20, in particular large 30, receiving lich by Aufkonzentrieren of a solution of such a mass to one as Hotmelt en.

The Aufkonzentrieren can find in corresponding equipped kettles or extruders instead of, in particular with the degassed one exerted by it is a degassing extrusion preferred., a such adhesive is in the DE 43 13 008 A1 stated, on whose content hereby respect taken will and whose content becomes part of this disclosure and invention.

In an intermediate step the solvent complete is extracted from these in this way manufactured acrylate masses.

< Desc/ Clms PAGE NUMBER 9 >

Additional ones become thereby other volatile constituents remote. After that

These masses only minor proportions at curse tigen constituents exhibit coating from the melt. Thus all can in the writing stated above stressed

Monomers/prescriptions to be taken over. An other advantage of the described

Masses it is to be seen in the fact that these exhibit an high K value and thus an high Moleku largewicht. The expert is known that systems with higher mole kulargewichten can be interlaced more efficiently. Thus the corresponding portion of volatile components sinks.

The solution of the mass can do 5 to 80 thread. - %, in particular 30 to 70 Gew. - % solvent contain.

Preferably commercial solvents become inserted, in particular low simmering hydrocarbons, Ketone, alcohols and/or esters.

A snail, Zweischnecken or more other preferably become multi-snail ex more truder with one or in particular two or several degassing units inserted.

In the adhesive on Acrylathotmelt basis Benzoinderivate in-polymerized can be, so for example Benzoinacrylat or Benzoinmethacryl RK, acrylic acid or methacrylic esters. Such Benzoinderivate is into the EP 0,578,151 A1 beschrie users.

In addition, the adhesive on Acrylathotmelt basis can be chemical crosslinked.

In one preferable embodiment particularly become as self adhesive masses copolymers from (Meth) acrylic acid and their esters with 1 to 25 C-atoms, mark in, Fumar and/or itaconic acid and/or their esters, substituted (Meth) acrylamides, maleic anhydride and other vinyl compounds, like vinyl esters, in particular vinyl acetate, vinyl alcohols and/or vinyl ethers inserted.

That remainder solvent content should bottom 1 thread. - % amount to.

An adhesive, which shows up as particularly suitable, is a low molecular Acry latschmelzhaftklebemasse, like it the bottom designation acResin UV or Acronal (D, in particular Acronal DS 3458, becomes guided of which BASF. This adhesive with nied

< Desc/ Clms PAGE NUMBER 10 >

receives its practical properties to rigem K value by a final radiation chemistry released crosslinking.

Further an adhesive can become used, which from the group of the nature chewing tschuke or the synthesis india rubbers or from any dazzle out nature chewing tschukun and/or synthesis india rubbers exists, whereby the natural rubber or those

Natural rubbers in principle from all available qualities as for the example Crepe, RSS, ADS, TSR or CV-types, depending upon required Reinheits-und viscosity level, and the synthetic rubber or the synthesis india rubbers from the group of the random copolymerisierten styrene butadiene rubbers (SBR), the butadiene rubbers (BR), the synthetic polyisoprenes (IR), the butyl rubber (IIR), halogenated Butyl chewing tschuke (XIIR), the acrylate india rubbers (ACM), which Etylen vinyl acetatecopolymers (EH) and the polyurethanes and/or their Blends selected to become to be able.

Further preferably can the rubbers to the improvement of the processability thermoplastic elastomers with a proportion by weight from 10 to 50 thread. - % added become, related to the entire elastomeric portion.

On behalf mentioned is in this place above all the particularly compatible Sty rol isoprenestyrene (SIS) - and styrene butadiene styrene (SBS) - types.

As tacky resins are without exception all previously known and adhesive resin described in the literature more insertable. Mentioned ones are on behalf the rosin of resins, whose disproportionierte, hydrogenated, polymerized, esterified derivatives and salts, the aliphatic and aromatic hydrocarbon resins, terpene resins and terpen of phenolic resins. Arbitrary combinations of these and other resins can become inserted, in order to adjust the properties of the resultant sticking mass as desired.

On the representation of the knowledge conditions in the " Handbook OF Pressure sensitive Adhesive Technology " of Donatas Satas (van Nostrand, 1989) is expressly referred to.

Hydrocarbon resin is a collective term for thermoplastic, colorless to intensive brown colored polymers with a molecular weight of generally < 2000.

They can be divided according to their provenance into three large groups: In petroleum, Kohlenteer-und of terpene resins. The most important coal tar resins are the Cumaron Inden

< Desc/ Clms PAGE NUMBER 11 >

Resins. The hydrocarbon resins become recovered by polymerization of the unsaturated compounds isolatable from the raw materials.

Hydrocarbon resins become also by polymerization of monomers such as styrene and/or by polycondensations (certain formaldehyde resins) accessible polymers with corresponding low molecular weight calculated. Coal water of material resins are products with within wide limits of < 0 C (with 20 C liquid charring of hydrogen resins) to > 200 C varying softening range and a density of approx. 0,9 to 1, 2 g/cm3.

They are soluble in organic solvents such as ethers, esters, Ketonen and chlorinating ten hydrocarbons, insoluble in alcohols and waters.

Bottom rosin resins becomes a natural resin understood, which becomes from the raw resin of Koniferen recovered. One differentiates between three rosin types: Balsam resin as distillation residue of turpentine oil, root resin as extract of Koniferen root sticks and Tallharz, the distillation residue of tall oil. The quantitatively largest importance has balsam resin.

Rosin is a brittle, transparent product from redder to brown color. It is water-insoluble, soluble against it in many organic solvents like (chlorinated) aliphatic and aromatic hydrocarbons, esters, ethers and Ketonen as well as in vegetable and inorganic oils. The softening point of rosin lies within the range of approx. 70 to 80 C.

Rosin is ein Gemisch out approx. 90% resinic acids and 10% neutral cloths (fat acidic esters, Terpenalkohole and hydrocarbons). The most important rosin resinic acids is unsaturated carbonic acids of the gross formula C₂₀H₃₀O₂, Abietin, Neo abietin, Lävopimar, Pimar, Isopimar, and Palustrinsäure, beside hydrogenated and dehydrierter abietic acid.

The amount ratios of this acidic ones vary in dependence of the provenance of the rosin.

< Desc/ Clms PAGE NUMBER 12 >

As softeners all known softening substances know inserted who that. In addition among other things the paraffinischen and naphthenischen oils count, (funktiona lisierte) oligomers such as Oligobutadiene, - isoprene, liquid nitrile rubbers,

<http://epo.worldlingo.com/wl/epo/epo.html?ACTION=description-retrieval&OPS=ops.epo...> 1/27/2010

the laser beam penetrates through the carrier layer and the adhesive layer and meets the glass river pigment, the absorber as well as in the second Pig mentschicht the laser-sensitive pigment.

In the first pigment layer with a glass river pigment and an absorber wāh rend the laser inscription only the glass is melted. In the second pigment layer with a glass river pigment, an absorber and a laser-sensitive pigment made during the laser inscription the desired junction of the metal oxide on the ground which can be marked, whereby over pulled the simultaneous metal oxide with a glass layer becomes.

It comes to a sintering process, during which the laser-sensitive pigment on the under becomes reason of transfered and is received a durable and stable composite with the substrate.

Sharp, high-contrast labels and identifications obtained become.

For the job of the adhesive on the carrier material as well as for the job that at least two pigment layers are suitable the known direct and indirect Auftragsverfahren.

< Desc/ Clms PAGE NUMBER 15 >

Mentioned ones are the Accugravur, the blade, the roll blade, the RCC, the Super Reco, the RAM method, the other use of a Lüftbürste and a casting method, then screen printing methods.

Acrylathotmelts can be ren on the carriers mentioned beside the Standardauftragsverfah like direct coating from nozzles, over rollers and. A. also in the Transfervverfahren up inertial, as they become bottom DE 43 24 748 C2 disclosed. The adhesive becomes first on an endless circumferential, antiadhesively equipped webbing applied and subsequent in one laminating station with need using printing and temperature the improvement mass anchorage on the carrier material of the practicing ore RA towards.

In principle also a job of the adhesive from organic solvents or as aqueous dispersion is possible; the economic and ecological advantages of the Hotmelt dosage form are appropriate however for the hand.

Further the adhesive and the pigment layers can raster-punctiformly by means of screen printing (DE 42 37 252 C2), whereby the Klebstoffpünktchen can be also of various sizes and/or different distributed (EP 0,353,972 B1), by gravure (DE 43 08 649 C2) in Längs-und transverse direction continuous bars, by raster pressure or by flexographic printing applied to become.

Both layers can preferably be present in Kalottenform by screen printing or be also in another pattern such as grating, strip, zigzag lines and for example also by gravure applied. Furthermore it can be for example also sprayed, which results in a more or less irregular order picture.

In a preferable embodiment these are ten applied in the form of polygeometrischen Kalot. - The calottes can exhibit different forms. Preferred ones are flattened hemispheres. Further also the imprint of other forms and patterns on the Trä is germaterial possible, as for example a print image in form alphanumeric indication combinations or pattern as grating, strip, the other Kumulate of the calottes and zigzag lines.

< Desc/ Clms PAGE NUMBER 16 >

By the single, in particular two pigment layers an improved protection of the colorgiving component becomes achieved. By the separation of the individual components in two or several layers the probability of an envelope of the metal of oxides rises by glass portions.

The multilayer laser transfer foil according to invention shows excellent own shanks, in particular much improves, when they exhibit the transfer foils, which have laser SI tive pigments in an homogeneous distribution within the sticking mass layer.

A there made intensive laser beam pigment sticking mass interaction. It comes to a thermal load, which can lead up to a destruction of the film (melt opens).

Further the sticking mass can thereby in their temporary gluing characteristic (sticking mass rewinding) and in the transfer of the pigments into or on the component strong negative influenced become.

The film according to invention does not point the negative effects to coatings and plastic plates (PP) due to the pigmented barrier layer to the verb living construction unit, but a durable label on the component.

Additional advantages arise as a result of smaller pigment employment opposite the homogeneous distribution of the pigment in the entire adhesive and from it resul animal-end smaller problems in the case of pigment dispersion and a small laser the jet pigment sticking mass interaction.

It becomes a very good inscription result achieved. It shows up besides over RA schend a small Schmauchbildung. The signatures shown direct after the label an easy broader however strong high-contrast label. After a polishing course the contrast a little diminishes, but the contours of the writing become somewhat sharper.

Also on rough surfaces it lets the film according to invention zen to excellent in set, so for example on ceramic(s) bases of fuses or general on glass.

< Desc/ Clms PAGE NUMBER 17 >

Particularly as stamped label the advantages full come to supports, the label can on the component applied and be belasert. After the label it becomes peeled. The procedure is terminated.

The laser transfer foil according to invention can be dargeboten as continuous roll, this in form of an Archimedean spiral around mostly a Papphülse wound is, and as stamped label. The latter can exhibit any shape, jeweili the adapted excellent towards targeted application.

On the basis the subsequent described figs will the film according to invention in particularly favourable embodiments near

explained, without wanting to limit thereby the invention unnecessary. Show fig 1 the setup of a film according to invention in form one

Label, whereby an additional second adhesive view aufge broke is, fig 2 the procedure of the label of a component bottom whom dung of the film according to invention.

In fig 1 is the setup of a film according to invention in form of a label shown.

The film sits down from the carrier layer 1, which first adhesive view 2, which is full laminar the carrier material 1 applied, from the first pigment layer 3, which contain a glass river pigment and an absorber, as well as the second pigment layer 4 together, whereby a latter glass river pigment, an absorber and a laser-sensitive pigment contain.

Both pigment layers 3.4 are likewise full-laminar applied.

Additional one is a second adhesive view 5 applied. This adhesive layer 5 is only partial calottes applied single in form.

<Desc/Clms PAGE NUMBER 18>

These serve the film on the under reason as supporting points and/or a positioning assistance.

The fig 2 the disclosed procedure of the label of a component 15 using the film according to invention. First the laser transfer foil, 15 applied at the best in form of a label, becomes on the component, whereby become achieved by the adhesive layer an adhesion and a fixation of the label. Subsequent one the made label by means of a laser, which by the red cylinder 10 indicated is.

In the first layer 3 the made melt opens 11 of the preferred glass particles, in the second layer the transfer 12 on the Substart, whereby the energy of the laser becomes 10 received by absorbers.

The glass particles coat finally after that melt opens the metal oxide (13), transfered on the component 15.

After terminating the inscription procedure the transfer foil remote becomes, on the component stays the desired label 12, which essentially consists of in zelnen dots, which exist coated metallic oxide deposits again of with a glass layer.